

What is claimed is:

1. A fuel reformer arranged in a fuel supply system leading from a fuel supply source to a combustion apparatus and comprising a casing provided with an inlet communicating with said fuel supply source, an outlet communicating with said combustion apparatus and a process chamber communicating with said inlet and outlet, and

a granular catalytic material filled in said process chamber of said casing, wherein a layer of metal oxide having a structure in which a bond with oxygen is gradually decreased as goes from the surface to the inside and photocatalytic property responding to an electromagnetic wave with wavelength longer than that of the ultraviolet ray is formed on the surface of said catalytic material.

2. A fuel reformer according to claim 1, wherein said catalytic material is filled in said process chamber so that a space rate is defined as 50% or less as the following equation:

Space rate (%) = [(capacity inside the process chamber – total volume of the catalytic material) / capacity inside the process chamber] x 100.

3. A fuel reformer according to claim 1 or 2, wherein said catalytic material is filled in said process chamber so that the total of the surface area of the catalytic material filled in said process chamber becomes  $5,000 \text{ cm}^2$  or more per flow rate 0.1L/min of the fuel passing through said process chamber.

4. A fuel reformer according to claim 1 or 2, wherein said combustion apparatus is an engine and said catalytic material is filled in said process chamber so that the total of the surface area of the catalytic material filled in said process chamber becomes  $5,000 \text{ cm}^2$  or more per displacement of 1,000cc of the engine.

5. A fuel reformer according to any one of claims 1 to 4, wherein the particle diameter of said catalytic material is 20mm or less.

6. A fuel reformer according to any one of claims 1 to 5, wherein said catalytic material has a hollow structure.

7. A fuel reformer according to any one of claims 1 to 6, wherein said catalytic material has an open hole piercing the catalytic material.

8. A fuel reformer according to any one of claims 1 to 7, wherein said casing is

provided with a cylindrically formed body portion and lid bodies covering each of both end openings of the body portion, and said lid body is removably attached to at least one of the both end openings of said body portion.

9. A fuel reformer according to any one of claims 1 to 8, wherein at least end of said process chamber is defined by a mesh-state material.